have been unable to obtain and have quoted them from others. I have knowingly omitted none that seemed important or the results of which seemed to contradict the general views suggested by the writer, with perhaps the single exception of the paper of C. B. Reichert (A. f. A. and Ph., 1871), who thinks that the early differentiation, in the embryo, of the epithelial layer and the central nervous system destroys all probability of the nerve endings being in the epithelium. How much his opinion is supported by fact, the more recent literature as adduced will enable you to judge. He rejects, in consequence, altogether the nerve-termination in the organ of hearing, as held by most observers, and even denies that the nerves pass through the openings in the zona perforata! a fact which every investigator with whom I am familiar admits and which I have myself witnessed. Reichert is the only one to my knowledge who so radically denies the results of the other investigators. To me the general agreement among so many observers, in such varied fields of research, seems to point unmistakably to some *one underlying truth.*]

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PLANTS USED BY THE INDIANS OF THE UNITED STATES.

BY DR. EDWARD PALMER.[1]

The first paper upon this subject by the writer was published in the Report of the Department of Agriculture for 1870. The present paper will embrace all the additional matter that has since come under his observation.

Fruits and Nuts.—Juniperus pachyphlœa Torr., one of the finest ornamental Junipers, its wood being excellent for cabinet work; height about forty feet, and diameter from two to three feet. Abundant in Arizona. Its fruit, a staple article of food among the Indians, is sweet, having but little of the juniper taste. As soon as ripe the Indians commence to eat the nuts raw, and to lay up great quantities for winter use. They are then ground fine and made into bread.

J. Californica, a dwarf but showy evergreen. Southern Californian Indians consume immense quantities of the fruit

[1] The writer wishes to acknowledge his obligations to Prof. Asa Gray; Mr. Sereno Watson, of Cambridge, Mass.; Dr. C. C. Parry, Davenport, Iowa, and Dr. George Vasey, Department of Agriculture, for kindly determining the species.

which is sweet and is eaten as soon as ripe. When the fruit is dry it is either ground fine and made into bread, or boiled in water to the consistency of mush. It must be nutritious, as the Indians get fat on it.

J. Californica var. *Utahensis* attains a height of twenty or twenty-five feet in Utah, and a diameter of twelve inches. The Utes eat the fruit raw or made into bread. As in the former species, the taste is quite sweet. These Indians use what they call Noo-ahn-tup, or what appeared to be excrements of insects left in hollows of the junipers, said to be ground and used for mush by the Pah-Ute Indians. The fibrous bark of this tree is made into saddles, breech clouts, skirts, and mats to sleep on. The bark is rather brittle and not so good for domestic purposes as that of *Cowania mexicana*.

J. occidentalis.—The berries of this tree are gathered and consumed for food but have more of a juniper taste than the former species.

Pinus torreyana, a very rare pine, on hills of Solidad, Southern California, only. The nuts are large and wholesome. Only the Indians near by gather them, as they are not in great abundance.

P. monophylla.—The common pine on the border of Lower California. It is a very productive tree. Its seeds, though rich, and good when fresh, are more digestible after being roasted, besides in that condition they will keep fresh a long time. Heat dissipates the oil property of the kernel and renders the hull brittle and easily removed. It is astonishing how many of these nuts an Indian can eat. From morning until night, as long as they last, cracking and eating go on. The Indians get very fat during a good pine nut harvest. They remove the hulls by putting a number of the nuts on a metate, and by rolling a flat pestle backward and forward until the hulls are loosened. The mass is then put into a flat basket tray and the hulls are blown off. The kernels are now ready to be eaten, or ground on the metate to flour, which if made into bread or mush is a palatable and nutritious dish. The interior of the young cone is also eaten.

As soon as the pine cones begin to open the Indians assemble for their great feast and camp among the pine trees during the nut harvest. The fruit upon the ground is gathered up by the children, while the females pluck from the trees the unopened fruit,

which they place in a net. Draw strings are tied around the neck of the net which, when full, is let down by means of a long rope fastened to the centre of the draw-string. Some one on the ground empties the load, and the net is drawn up to be refilled. Thus for many days this gathering goes on until the supply is exhausted, or they have satisfied their wants. To hasten the opening of the cones, they are thrown on hot ashes for a few minutes. The seeds are at once removed and put into an earthen pot over a slow fire. After a few stirrings they are sufficiently parched to render the hull brittle, so as to be easily removed, while the oil in the kernel is set free. By this process the kernel is rendered more digestible and will keep for a long time. If not parched, the seeds would soon become rancid and mouldy.

Algarobia glandulosa or *Prosopis juliflora*, in Texas, Arizona, New Mexico, and Sonora, grows from twenty to forty feet high, and eighteen inches in diameter. Charcoal is manufactured from it, and it is also made into handsome furniture, the grain being very fine. It flourishes where no other fruit tree would grow, and is one of the most useful trees of the deserts. It yields a gum nearly indentical with gum arabic for medicinal and technical purposes, especially in the preparation of mucilage, gum drops, jujube-paste, &c. In parts of Texas great quantities are gathered for exportation. The Indians have long been acquainted with its valuable properties, for they not only eat it but mix it with mud and cover their heads with it for two or three days. When washed off, the hair of the oldest is not only jet black, but the unwelcome visitors that previously lodged therein are all dead. The leaves of this plant are used by the Indians of Southern California to give the blue color to their freshly tattooed faces, the spines of a species of cactus being used to puncture the skin. The moistened leaves are then rubbed over the markings and the desired color is obtained.

The fruit of this plant is one of the leading articles of diet with the Utah, New Mexico, California and Arizona Indians. It is gathered and housed with great care. Last winter I watched the process of converting the seed-pods of this plant into bread. A female squatted herself on the ground by a wooden mortar, the lower end of which was some distance in the ground. With a long stone pestle she pounded the hard seed-pods into meal. She then took from her head a small conical hat, and sprinkled a

little water on the inside, then a little meal alternately, until the hat or bread tray was filled. After being patted on the top, it was set on the ground and exposed to the direct rays of the sun for some hours, or until it would turn out a solid cake or bread. So little water had been used to wet the meal that it seemed to me it would not stick together, but possessing a large percentage of sugar, little water was necessary. This was rather chaffy-looking bread, not unlike that made of corn meal with all the bran in it; nevertheless, it was very sweet. The Indians keep fat as long as this bread lasts.

Quercus emoryi, a rather common tree in Arizona, but the wood is of no use except for fuel. This tree as well as other varieties in the same region, however, yields abundance of food.

In the Smithsonian collection at the Centennial Exhibition was a sample of sugar from the mountain oak, at McCloud river, sent by L. Stone. The sugar or manna-like substance was in small irregular lumps of a dull color, and very brittle.

Q. undulata var. *pungens*.—This is a dwarf, compact bush, and very prolific. Its fruit is as sweet and as pleasant as fresh chestnuts, and is considered a great delicacy by the Lower California Indians. So ripe are the nuts before they fall, that nearly every one germinates while still in the cup.

Q. chrysolepis, the finest of Southern California evergreen oaks, produces the largest acorn and cup, but, though much used as food, the nuts are not considered as good as some others.

Q. sonomensis; a common deciduous oak of the hills about Julian, Southern California, very productive, affording much choice Indian food.

Q. agrifolia; this beautiful evergreen oak is very abundant in Southern California. When deprived of its branches, it will sprout again as freely as a willow. Its fruit is considered by Indians superior to all other acorns. The failure of the acorn crop is a serious loss, and drives the Indians of Southern California to hunt up every kind of substitute for them. In preparing food from acorns, the first thing is to take off the hulls. This is done in a mortar by a few slight strokes. The hulls are then removed, and the kernels reduced to a very fine meal. As all acorns, with few exceptions, possess a bitter, astringent property, which renders them unfit for food until it is removed, the Indians accomplish this by laying a coarse flat basket or strainer on a pile of gravel

with a drain underneath. Rather fine gravel is now scattered thickly over the bottom, and up the sides of the strainer, and the meal laid thickly over this gravel. Water is added, little by little, to set free the injurious matter. When the water ceases to have a yellowish tinge, the deleterious property has been separated. The meal is removed by the hand as much as possible, after which water is poured over the remainder, so as to get the meal together. It is then scooped up by the fingers, very little being wasted in the operation. The meal is cooked in two ways: First, by boiling it in water, as we do cornmeal mush. When cooked by this process, it is not unlike yellow cornmeal mush in appearance and taste. The second mode is to take the meal, as soon as it is washed, and make it into small balls which are wrapped in green corn leaves. These balls are then placed in hot ashes, some green leaves of corn are laid over them, and hot ashes, placed on the top of sufficient thickness to bake the cakes. These are considered extra nice by Indians. Females not only gather and store the acorns, but perform all the work necessary to convert them into food.

Rhus aromatica var. *triloba* (Squaw berry), so named because the Indian women gather large quantities of the berries which are used as food. They are of a red color, and excessively sour, but very much used while fresh, during the summer months. The berries when macerated makes a very pleasant drink, and they are also dried for food. The young twigs of this plant are used in the manufacture of baskets. The wood exhales a peculiar odor, which is always recognizable about Indian camps, and never leaves articles made from it. It grows loosely in mountain ravines, and attains a height of five to eight feet.

In Utah, Arizona, Southern California, and New Mexico, the Indians depend solely upon this plant for material out of which to make their baskets. It is far more durable and tougher than the willow, which is not used by these Indians. The mode of preparation is as follows: The twigs are soaked in water to soften them, and to loosen the bark, which is scraped off by the females. The twigs are then split, by the use of the mouth and both hands. Their baskets are built up by a succession of small rolls of grass stems over which these twigs are firmly and closely bound. A bone awl is used to make the holes under the rims of grass for the split twigs. Baskets thus made are very durable,

will hold water, and are often used to cook in, hot stones being dropped in from time to time until the food is done.

Cerasus ilicifolia.—Indians eat this fruit and save the seeds which they consume raw, or ground and cooked into mush. They are dried whole or split. This is a very common plant in California, and is very productive. Its fruit is of a yellow color, with a pink tinge, and has the shape of gage plums, but possesses little pulp. The seeds are large, affording much food.

C. demissa.—The wild cherry of Southern California, a dwarf bush, but very productive. Its fruit is palatable, either fresh or dry, and in both conditions it is largely consumed by the Indians.

Sambucus glauca (White elderberry); *S. racemosa* (Red elderberry).—The fruit of both these species is eaten by Indians. In Southern California the red species is preferred, being more fleshy and juicy than the white.

Mesembryanthemum acinaciforme (called strawberry). Its fruit resembles the strawberry in taste. This is one of the common plants along the sea-coast of Southern California, growing on sand beaches. It is very productive, and is eaten not only by Indians, but by Mexicans and other Whites.

Lycium pallidum, with scarlet fruit; *L. berlandieri*, Arizona, with fruit of a red color.

L. andersoni.—Fruit bright red, or amber color; Central Arizona and South-eastern California. The berries of these *Lyciums* are eaten by Indians of Arizona and California; in fact, Whites relish them also. They are quite agreeable to the palate, being of a sweet, mucilaginous substance, and adapted to warm climates. The clear bright-colored berry has a very tempting look, and when dried, resembles in taste dried currants.

Brahea armata.—This fine palm, found at the bottom of the Big cañon of the Tantillas, Lower California, grows from fifty to sixty feet high, its long, graceful, pendant branches of fruit making it a beautiful object. The Cocopah Indians consume large quantities of this fruit while fresh, and dry it for winter use; they also eat the base of the young leaves.

Pritchardia filamentosa.—This tree, from forty to fifty feet in height, is not so beautiful as *Brahea armata*, but its fruit is better food, containing more pulp, being much larger and of a more agreeable taste. Cocopah Indians consume the fruit fresh and dry in great quantities; the leaves could be applied to many use-

ful purposes. In the spring the base of young leaves is eaten raw by the Indians. The seeds of both these species of palms are ground fine and eaten, and are not inferior to cocoa-nut.

Shepherdia argentea (Buffalo berry), grows by water courses in mountainous districts of Central Utah. The habits of the tree are similar to those of the elderberry. It grows from ten to fifteen feet high, bears abundantly, fruit red, small, roundish, sour, but has a pleasant taste.

Amelanchier alnifolia (Service berry).—The fruit of this bush is much esteemed by both Indians and Whites.

Rhus integrifolia, produces abundance of red berries that are very acid. Indians of Southern California place them in water to form a cool acid drink.

Ribes menziesii.—Fruit very thorny, but Indians scald them to make them eatable.

Simmondsia californica.—The nuts of this plant yield a very fine oil. Indians of Southern California use them as an article of food.

Arctostaphylos tomentosa, Manzanita of the Spanish.—The fruit is produced in clusters, and resembles a small apple. It is of an agreeable acid sweet, and is consumed largely by Indians and Mexicans, both in the ripe and dry state. Indians dry the berries in great quantities, and prepare a favorite drink from them. A quantity of the dried fruit is slightly pounded until the pulp is separated from the seeds and outer rinds, the flour or finely pounded pulp is separated and mixed with water which is allowed to stand until fermentation takes place, when it becomes intoxicating. This fruit, flour or dust is also eaten dry. The seeds after being deprived of their covering are ground fine and made into mush. A favorite mode of using the dried fruit is to grind it up fine and after mixing the flour with water, to form the mass into thin flat cakes which are baked in hot ashes. This bread is sweet and not disagreeable to the taste, though it has a repulsive, clay-like appearance of a reddish-brown color. All the western Indians relish this fruit in whatever way it is prepared. The Pah-Ute Indians use the leaves as tobacco and for medicine.

Photinia arbutifolia.—A beautiful tree whose berries are eaten by Indians of California, being first parched and ground, and then made into mush.

Vitis arizonica, V. californica.—Indians of California, Arizona and

Southern Utah consume large quantities of both species of grapes in the ripe state. They dry them also for winter use. The seeds of the ripe fruit are saved and ground fine and eaten in that condition; they sometimes also grind up the dried grapes and cook them. The Pah-Utes at St. Thomas, Nevada, had several sacks of dried grapes for sale last spring.

Comandra pallida.—This plant yields a small nut which is eaten raw by the Pah-Utes and the white children of Utah. If eaten too freely it produces nausea.

Roots and Tubers.—Apios tuberosa, common throughout the Northern and Southern States. It is known under the name of *Saa-ga-ban* by the Micmacs, by whom the pear-shaped roots are used as an article of food. The tubers are about the size of cherries, resembling common potatoes in taste, shape and odor. The skin is of a rusty or blackish-brown color. They contain a large per cent. of starch, which resembles that of wheat, and are very wholesome.

Zamia integrifolia (coontie root).—From the tubers of this plant the Florida arrow-root is made. It is abundant in the southern part of the State. The tubers are large, frequently a foot long and three inches in diameter, rough and dark on the outside, but white inside and yield a large per centage of starch. It possesses an acid, poisonous ingredient which has to be washed out in the process of converting the root into starch. The Indians of the Everglades consume a great deal of starch as food, prepared by their rude processes, and also sell some, but it is inferior to that prepared by Americans with improved machinery.

Hesperocallis undulata, (White lily).—The bulbs of this beautiful plant are used as food by the Indians of Arizona.

Sagittaria simplex.—The Mojave Indians of the Colorado river, Arizona, as soon as the water subsides in the spring, dig the bulbs of this plant, which resembles the crocus root. It is exceedingly farinaceous and palatable, whether raw or cooked with other substances.

Cnicus occidentalis?—The roots, which are about the size of carrots, are sweet and well flavored, but require a long preparation to fit them for use. A favorite food of the Pacific coast Indians.

Carum gairdneri.—The tuberous roots of this plant are much eaten by the Indians of the Pacific coast, either raw or boiled

with other substances. When raw it has a nutty taste but when cooked assumes a carroty flavor. Its outer surface is grayish, but its interior is white and farinaceous.

Milla capitata var. *pauciflora*, commonly called by the Mexicans of Sonora and Arizona, Corvena. It is rather a small bulb, resembling the crocus both externally and internally. Its taste is agreeable, sweet and mucilaginous, and is considered very nutritious, even by Americans.

Amoreuxia schiedeana; Himajins of the Papajos; *Saya* of the Pimos. It furnishes to the Indians of Arizona just named, an edible root. They eat it roasted or baked in hot ashes. It is quite palatable, with a slightly bitter tang.

Camassia esculenta.—Wild hyacinth, a very common plant in the upper Mississippi valley. Indians and Whites eat this root and find it very nutritious, with an agreeable, mucilaginous taste.

Valeriana edulis.—The root of this plant is eaten raw or dried; it is also ground into flour and made into bread or mush by the Pah-Ute Indians.

Claytonia lanceolata.—The roots of this plant, though small, are prized by the Pah-Utes as food, having a pleasant, crisp and nutty taste.

Psoralea castorea Watson, new species.—This plant grows in exposed sandy localities between Beaver Dams, Arizona, and St. Thomas, Nevada. The tuberous roots are large, very white, and farinaceous. The Pah-Utes eat them raw, or cooked in hot ashes, or ground up and made into bread or mush.

Psoralea mephitica Watson, new species.—The leaves of this plant yield a very disagreeable smell, but the tuberous roots, though small, are farinaceous and are consumed as food after being prepared as mentioned for *Psoralea castorea.* It is abundant on the low places between the hills south-east from St. George, Southern Utah, and the Pah-Utes resort there to collect its roots.

Roots of carrots, potatoes, beets, turnips and parsnips are eaten by Pah-Utes. These Indians have acquired the taste for the tubers of all these plants and they consume them in great numbers, either raw or cooked, without being cleaned. They place them in the hot ashes and devour them when cooked, skins, dirt and all. When boiled, not only are the tubers eaten but the water in which they were boiled is drank.

Seeds.—Corn, Native Indian; *Ah-weaph* of the Pah-Utes. This

variety has been grown by the Indians since the recollection of the oldest person among them. Well preserved kernels and cobs are found in the mounds of Utah. This species of corn grows from two and a half to three feet high and is cultivated by the Indians on the river bottoms, maturing in sixty or seventy days. The ears come out of the stalk five or six inches from the ground. Corn is a staple article of food with these Indians. In 1873 a Pah-Ute Chief, Tutzegavet, brought some very fine corn of his own raising to the agricultural fair, held at St. George, Southern Utah, and the first premium for that product was awarded to him.

Helianthus petiolaris, H. lenticularis, native sunflowers, *Awk* of the Pah-Utes. The seeds of these plants form one of the staple articles of food for many Indians, and they gather them in great quantities. The agreeable oily nature of the seeds render them very palatable. When parched and ground they are highly prized and are eaten on hunting excursions. The meal or flour is also made into thin cakes and baked in hot ashes. These cakes are of a gray color, rather coarse looking, but palatable and very nutritious. Having eaten of the bread made from sunflowers I must say that it is as good as much of the corn bread eaten by Whites.

Mokeack Sunflower.—A Pah-Ute chief obtained some seed of the large, cultivated sunflower and planted them, raising a large crop. Now many of the Indians plant this sunflower, and it goes under the name of the Chief Mokeack.

The native sunflower of Utah yields an exudation from the stems of creamy white color, nearly tasteless, but of a gummy nature. It is eaten by the Indians and white children of Utah, or rather chewed in place of pine gum.

Portulaca oleracea.—The seeds of this plant after being reduced to flour are eaten in the form of mush. The plant when tender is cooked as greens by the Pah-Ute Indians.

Sporobolus cryptandrus, or Quaque of the Pah-Utes, a species of grass, the seeds of which are much used by the Indians as an article of food. After being parched they are ground and mixed with water or milk and made into mush or biscuits. The flavor is good, and food thus prepared is very nutritious. The leaves yield a short, fine fibre, adapted to the manufacture of paper. It is abundant about St. George, Southern Utah.

Sporobolus airoides, Eragrostis purshii, Panicum crusgalli and

Vilfa asperifolia are very abundant grasses in Southern Utah, and their seeds are gathered in great quantities for food by the Indians, who first parch, and then grind them to flour, which is eaten either dry or in the form of bread or mush. It is healthful, nutritious and more agreeable in flavor than buckwheat.

Atriplex californica.—This plant grows in ravines and has large, long roots which are much used by Indians and Mexicans of California as a substitute for soap. After being pounded and mixed with water, it is said to be especially good in cleaning woolen fabrics. The seeds of this plant are also gathered, parched, reduced to flour, and made into mush or bread. At other times the seeds are ground without parching and used as if parched.

A. powellii, A. lentiformis, A. expansa, A. confertifolia, A. nuttallii, A. canescens.—All these yield abundance of seeds, which are gathered by the Indians of Utah, Arizona, and California. The seeds are ground into flour and made into bread or mush.

Sarcobatus vermiculatus, "Grease wood" of the plains.—It produces abundance of seeds, which are prepared for food in the same manner as those of *Atriplex,* and eaten by the western Indians.

Audibertia polystachya, white sage of California, is a very common plant in many parts of the State. From its flowers the bees make the celebrated honey for which San Diego is famous. Indians gather the seeds and use them cooked with other substances to impart flavor, as we do parsley.

Halostachys occidentalis, called *Tub-bo-welts* by the Pah-Utes.—The seeds are ground fine and made into bread or mush. It is one of the regular articles of diet.

Amarantus leucocarpus, A. powellii, Camoot of the Pah-Utes.—The seeds of both these species are highly prized as food products. They are regularly cultivated by the Pah-Utes and are also found abundant in the wild state on river bottoms. The plants are very prolific in seeds, which are very nutritious and of an agreeable taste. Bread or mush made of the meal is very good and not to be despised.

Lepidium fremontii, L. intermedium, Sisymbrium sophia, S. canescens.—The seeds of all these plants are ground up with other seeds to impart flavor, and cooked into bread or gruel. Sometimes they are eaten separately or even in soups. Many of the western Indians use these seeds unmixed as food.

Salvia columbariæ; Chia of the Mexicans and Indians of Arizona, and New Mexico.—The seeds are used by them as food and medicine. Steeped in water they form a very nutritive drink for the sick. In the form of mush they resemble flax in properties and taste. In Mazatlan, Mexico, a drink prepared from the seed is sold in the streets. The meal forms a fine poultice for wounds, &c.

Medicago sativa, the introduced plant, alfalfa. The Pah-Utes use the seeds ground up and cooked into mush or gruel. The Indians and white settlers gather the tender branches and cook them as greens.

Miscellaneous.—Scirpus validus (Tule plant). The Indians of California make bread out of the pollen of this plant, and the root is eaten by many tribes either raw or made into bread. The leaves are woven into mats and are used to cover their huts.

Typha latifolia (cat-tail rush). The Pah-Utes eat the flowering ends, in the spring, raw or cooked. When boiled in water they are very tender, making good soup, which is considered a great delicacy.

Eriogonum inflatum.—The tender stems of this plant are rather acid, they are eaten raw by the Indians of Southern Utah.

Porphyra vulgaris, a sea weed commonly called Laver on our eastern coast. It is found in nearly all parts of the world at low tide. Many of the Indians along the Pacific coast eat this plant cooked as greens or with meat. It is much relished by Chinamen and is quite an article of commerce. The Chinamen residing along the coast, at low tides, gather this plant, which is easily taken from the rocks. It is then placed in round masses to dry, after which they are baled and sent to China. It sells from five to eight cents per pound in San Francisco at wholesale, to be shipped to China.

Caulanthus crassicaulis and *Stanleya pinnatifida* are eaten raw in the spring by the Pah-Ute Indians, the young plants being tender, and when cooked taste like cabbage. For this reason these plants are called cabbage by the settlers of Utah. The Indians gather the seeds and after reducing them to flour make them into mush.

Cotyledon lanceolata, C. pulverulenta, &c.—The tender leaves of these plants in spring are eaten raw by the Indians of Southern California; their soft, succulent nature causes them to be prized

by some white people. As they grow in places not contiguous to water, the moist leaves are used to quench thirst.

Aphyllon californicum and *A. ludovicianum*, are parasitic plants that grow upon the roots of many species. All the plant except the bloom grows under ground, and consequently is nearly all very white and succulent. The Pah-Utes consume great numbers of them in summer while on their hunting excursions after rabbits. Being succulent they answer for food and drink on these sandy plains, and, indeed, are often called "sand-food."

Hemizonia fasciculata, Tar-weed.—This plant in case of hunger is eaten by the Indians of Southern California after being cooked in the following manner: A quantity of the plants are boiled down until the liquid is of a thick tarry consistency, when it is ready for the stomach of the Indian. Its tar-like taste is objected to by some. A youthful brave was very careful to inform me that young Indians never eat that stuff. If the procuring and cooking of the same depended upon the young Indians (males), they would go hungry a long time, for their laziness scarcely stimulates them to collect food; even if hungry they expect everything to be done by the older females.

Madaria elegans.—The seeds of this species of tar-weed are ground into flour, made into thin cakes, and baked in hot ashes by the California Indians. When cooked the bread has a gray but not very inviting look, yet the Indian eats it without complaint though he prefers corn bread.

Arundo phragmitis, a species of cane growing along water courses and about springs in Southern Utah. Numerous small insects puncture the leaves of this plant and a liquid exudes. While in a soft state it is scraped off by the Indians with their long finger nails and eaten. At first it has a paste-like softness, but hardens like gum arabic, with a sugar candy density and color, having a rather sweet, gummy, licorice taste. When the exudations are sufficiently hardened the cane is cut and laid in bundles on blankets, the manna-like food is then easily shaken off. This substance if mixed with water forms a pleasant, nutritious drink, highly prized by the Indians who call it Pah-gump-pea-abbah.

Honey.—Since the introduction of bees to the Pacific coast the Indians have acquired a taste for honey. The climate being mild the bees increase rapidly and many swarms yearly escape to trees

and rocks, thus giving the Indian a chance to obtain the honey. Some California Indians have domesticated the wild bees. In Southern California the Indians cut down the trees containing bees, put them in a sack, carry away the honey to eat and sell the bees for one dollar a swarm, the purchaser taking all risks of getting a queen. Bees in a sack, for sale by an Indian, are surely a novel article of trade.

[*To be Concluded.*]

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THE ANCIENT PUÉBLOS, OR THE RUINS OF THE VALLEY OF THE RIO SAN JUAN.

BY EDWIN A. BARBER.

PART II.

A MOST peculiar style of architecture prevails in the Montezuma cañon, in south-eastern Utah, which is entirely different from anything that occurs elsewhere. For instance, on a little island-plateau, rising from the middle of the valley to a height of forty feet, are the walls of a considerable edifice. Long narrow stones, measuring from four to seven feet in length and a foot or so in their other dimensions, have been set up like posts in a fence, standing at different distances apart, from two to ten feet. Between these the spaces have been filled in after the usual style of masonry. Some of the slabs are now standing at an inclination of several degrees, having been pushed outward by the accumulating *débris* inside. These are imbedded in the earth only to a depth of a few inches or a foot (See fig. 1, plate v., also fig. 1, plate vi).

Further down the cañon a somewhat similar ruin may be seen. Along the eastern side of a great parallelogram stand seven of these upright stones, some of them measuring, above the surface of the soil, nine feet. In their general appearance they somewhat resemble the dolmens or sacred stones of the Eastern Hemisphere, but evidently they had not been used for religious purposes. They had been built in the walls like pillars for the purpose of strengthening the original structures (See fig. 2, plate v).

The remaining figure on this plate (3), represents a group of